LOCK ON N°27

AIRCRAFT PHOTO FILE

Sukhoi Su-22 M3

by Zoltán BUZA

edited by Willy PEETERS

VP the world in scale

938

Su-22M3

3rd "Fürkészdarázs"
Tactical Reconnaissance Squadron
Hungarian Home Defense Forces / Taszár

VP
the world in scale

Cover : A Sukhoi Su-22M3 or "Iron Cricket" reflecting some early morning autumn sunshine at Taszár. It's strange that none of the numerous nicknames given by its pilots reflects the awesome power of this fighter.

Title Page : The basic ordnance load of two 850 liter drop tanks and the KKR pod carried during routine recce sorties, can be supplemented by the SPS ECM pod and R-60 dogfight missiles for increased survivability.

Page 3: On hold short of the runway, with its wings already swept forward and the flaps and slats in take-off position, this "Flying Locomotive"still has its taxi lights lit. Note the landing gear extended position indicator lights.

Rear Cover: Final moments of a practice dogfight with a fellow squadron member framed by the gun camera of Lt. Miklós Vigh's Su-22M3. The gunsight indicates a "direct hit" from 500 m in a right turn. At this distance, a couple of rounds from the NR-30 cannons would have had a devastating effect.

For Anikó and Amanda

ACKNOWLEDGMENTS

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Zoltán BÚZA.

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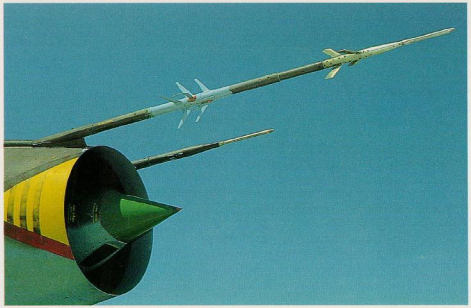
INTRODUCTION

Being a Warsaw Pact ally, Hungary was obliged to upgrade its tactical reconnaissance duties and committed itself by forming a squadron of fast jets, replacing the previously used L-29 jet trainers. So, by the end of 1983, soviet AN-12 transport planes, conspicuously disguised as Aeroflot cargo airliners, departed Komsomolsk with factory fresh Su-22 fighter/bombers on board, to land at a remote air base in Hungary.
The reason for this deceivement was not clear because the Aeroflot markings were never taken seriously, and the tail gunner's "twins" on the "commercial" turboprops are still a subject of conversation at Taszár. After unloading, final assembly was performed by Soviet personnel. Delivery of the twelve M3s and three UM-3K two-seaters finished in February, 1984, and on the third of March the first Su-22 with Hungarian markings lifted off from the Taszár concrete with a factory test pilot at the controls. The aircraft received two-digit tactical numbers ranging from "01" to "16" with the exclusion of "13" at the pilots' request.
It is still not clear why Hungary got the M3 with the advanced M4 already available, but that was very likely a Soviet decision. Additionally, similarity of the M3 powerplant with that of the MiG-23MF (although slightly different) already in service may have played a role too.



The KKR pod and 850 liter droptanks indicate that "03" is leaving for a routine recce mission, its wings swept in the full aft position for taxiing. On the ground and at low airspeeds, two pairs of suction relief doors (hinged on bulkhead N°3) occasionally open inwards to provide auxiliary air for the engine. Passing Mach 1.35 the adjustable nose cone slides forward, detaching the oblique shock and restricting the intake area, all controlled by the ESUV-1V system in accordance with speed and engine air consumption. This system also opens the earlier mentioned suction doors, this time outwards to release excess air from the intake duct after the cone reached its most forward position.
Note the difference in color contrast between front and rear fuselage, because of the former being covered with canvas on parked aircraft.

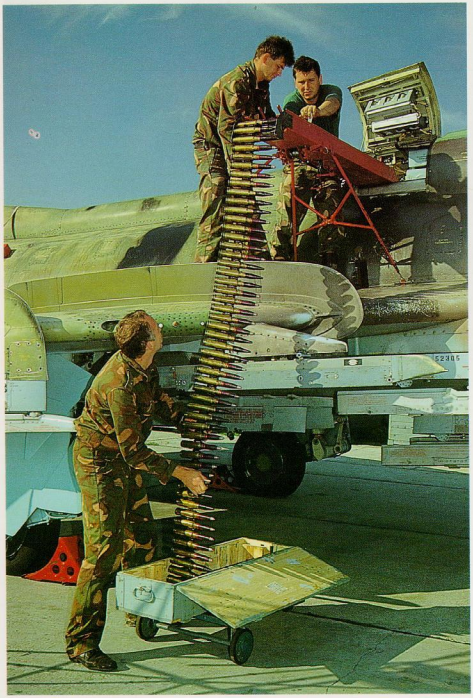
The main pitot boom is positioned on starboard side and consists of a PVD-18-5M pitot head, pitch and yaw vanes and the complex RSBN-6s radio navigation and landing system aerial. The auxiliary pitot tube is on the left. Also apparent is the small window of the KLEN-PS laser rangefinder and target designator on the underside of the nose cone.

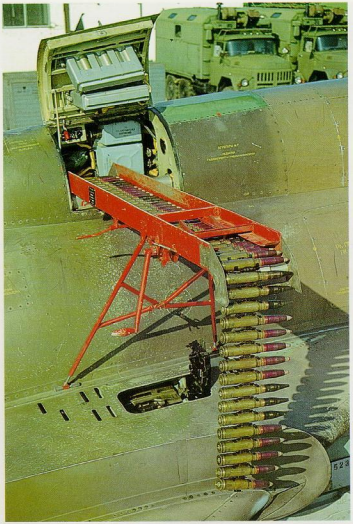
The auxiliary air intake can be seen in almost any position on parked aircraft. Usually, the upper ones open inward and the lower ones slightly outward because of gravity. Note the wing leading edge and pylon close to the muzzle is protected by heat resistant steel plates.

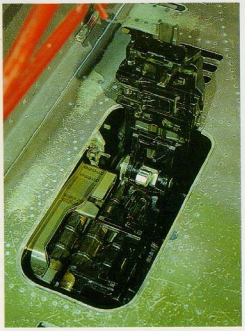
"Grandpa", alias Lt.Col. József Vámos prior to boarding "03", wearing the standard summer flight suit and flying boots, white ZS-5 helmet, KM-32 oxygen mask and IPS-72 harness.

On the morning of March 17th, 1988, he safely ejected from flamed-out "06" at an altitude of only 150 meters, witnessing the only Su-22 loss in ten years.

Armament specialists Capt. Béla Tamási, RSM József Vass and SM Atilla Nemes in the process of reloading the starboard NR-30 cannon with 80 rounds of OFZ (high eplosive fragmentation incendiary) and BR (armor piercing /high explosive) ammunition.
Both ammo belts encircle the air duct, starboard belt is at the rear.

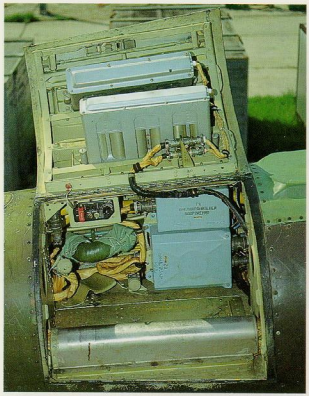


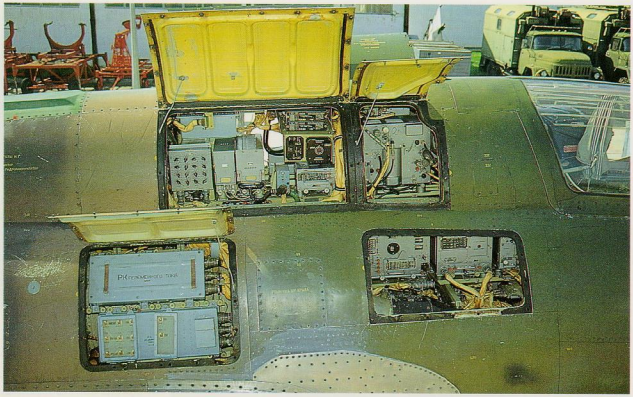




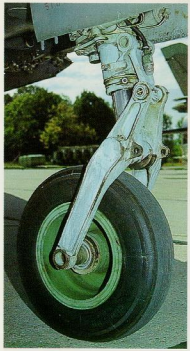
Both cannons are loaded through the same hatch aft of the ARK-15M aerial. The KDS-23 dispensers, each containing six pyrotechnically fired decoys (PPI-50 flares and PRP-50 chaffs) are attached to the hatch. Also visible are the underwing pylon circuit breaker box, the R-60 missiles relay box and the KDS dispenser control unit.

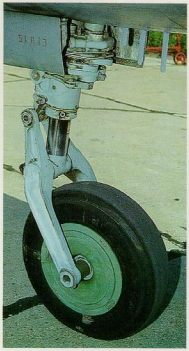
Close up of the starboard cannon bay with open feedcover, revealing the position of the first round prior to charging. The NR-30 cannon, already some 40 years old, still is an extremely powerful weapon, especially against ground targets. It weighs 66,5 kg and is 2153 mm long. Firing is up to a rate of 830 rounds per minute with a muzzle velocity of 780 m/s.

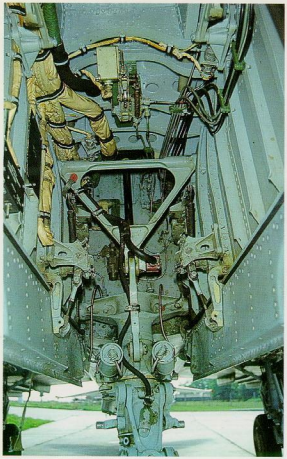


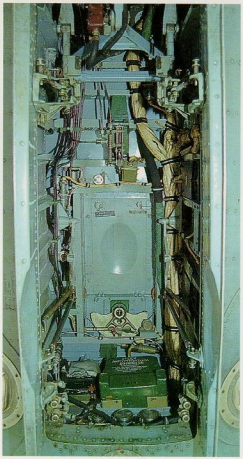


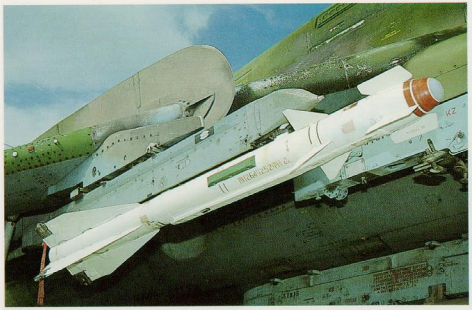
The dorsal spine houses most of the avionics, modular units which are easy to replace. Among them are the ARK-15M radio compass, IKV-1 inertial platform, SVS-II-72-3 air data system, SAU-22M1 autopilot, DISS-7 Doppler radar and RSBN-6S navigation and landing system. Nose wheel detail and wheel bay interior can be seen below.

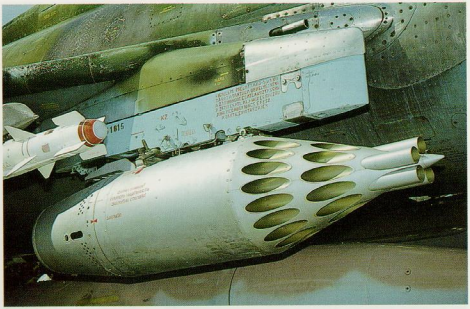












(Left, top and middle) Two close range, IR homing R-60 missiles can be carried on APU-60-1M(P-62-1M) launchers attached to the small PD-62-32 pylons (stations N°9 and N°10). Extreme maneuverability of the missile is achieved through the "destabilisators", the small fixed winglets ahead of the canard control fins. Tail wings are equipped with rollerons for flight control.

(Above right) A salvo of 32 S-5 type folding rockets can be fired from the UB-32A launcher, of which six can be carried on the inner and outer wing pylons (N°5,6,3,4) and forward underfuselage stations (N°1,2). Launcher length is 2080mm, diameter is 481mm and weight (fully loaded) 109kg.

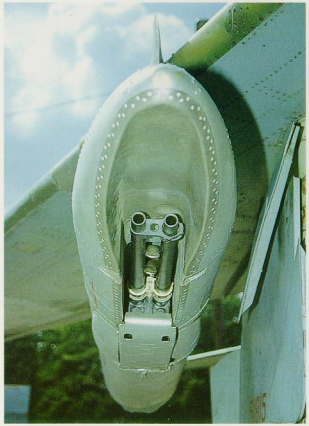
Up to four H-25ML laser homing air to ground missiles are attached to APU-68-UM3 launchers (on BD3-57MTA pylons with S-52-8812-300 adapter racks), installed on outer fuselage stations 1R and 2R. Similar installment on standard BD3-57MT pylons on outer wing stations N°3 and N°4.

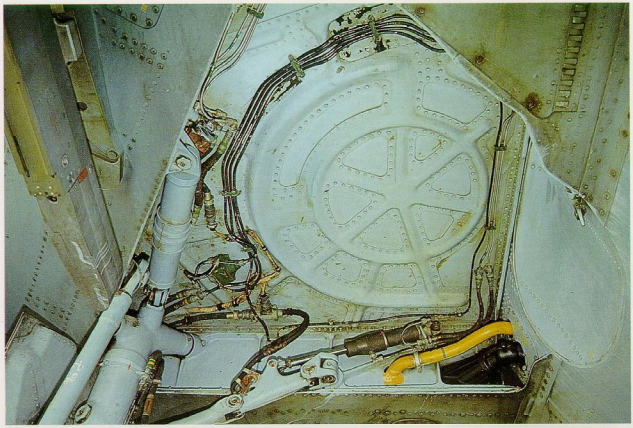
The missile can be launched at altitudes of 100 meters up to 5000 meters and has an effective range of 10 km. Note the narrow fairing at the bottom, covering electric lines.

(Above) Rear view of the UB-32A launcher attached to the standard BD3-57MT pylon on wing station N°6.

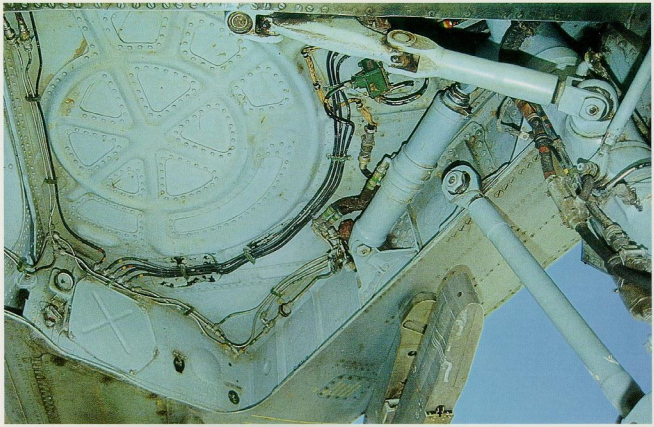
GSh-3L twin barrels in stowed position. Note upper landing gear door.

The huge S-25-OFME unguided air to ground missile is stored inside the O-25-L/E launcher. It is attached to the outer wing pylons and has a total length of 3575 mm (launcher 2860mm) with 370mm width and 460mm height.
The SPPU-22-01 gun pod houses a pivoted GSh-23L twin barrel cannon and 260 rounds of 23mm ammo. In "fixed" mode barrels are at a pre set angle of 0-30 °. In "program" mode declination is controlled automatically by the aiming system.



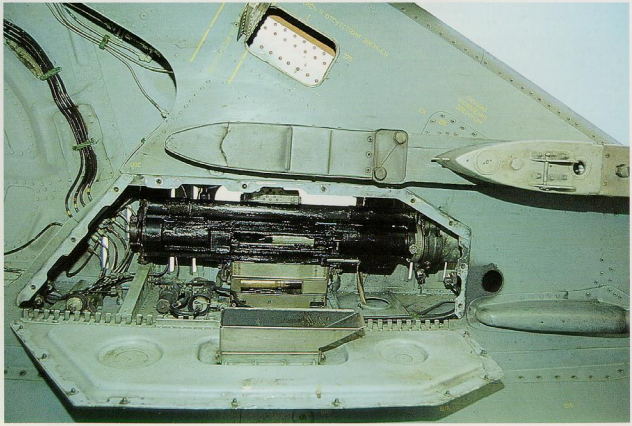


The hydraulically operated main landing gear is stowed in the wing when retracted. In emergency situations it can be lowered by pressurized air. Very significant is the embossed pattern in the wheel well roof surrounded by pressurized air hoses.
To the rear wall can be seen the gearbox of the wing swing synchro drive shaft (at the wingroot), the yellow fuel pipe connecting the wing tank and the N°2 fuselage tank, the sidestrut/downlock with its hydraulic actuator and the angled hinge of the shock strut.
The KT-69/4S wheel equipped with 880x230 mm tire (compared to 660x200mm K2-106A nose wheel) is mounted on a swing arm and rotated behind the main gear covers through the torque scissor linkage during retraction.
The UP-22 electropneumatical valve of the anti-skid system, pressurized air and electric lines are present on the shock strut. Note the extended position indicator light on the torque link. The UA-27A anti-skid sensor is mounted laterally on the wheel hub. Only partially visible are the details of the multi disc brake assembly.

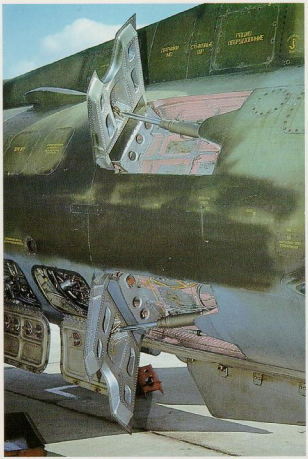


Details on the outer wall of the wheel well are the hinges of the swiveling control link and the gear hydraulic actuator. Note the natural metal hydraulic piping. On the front wall can be seen a 27V DC socket, an access hatch to the cannon bay and the filler point and pressure gauges of the pneumatical system. The gear door lock is located in the fuselage recess.

The starboard NR-30 cannon is positioned more outward and to the rear than the port cannon, its access door is shaped differently with the bay venting intake positioned in front. The spent cases are ejected through the chute in the door. The collected ammo links can be removed through the small hatch at the top of the photo.

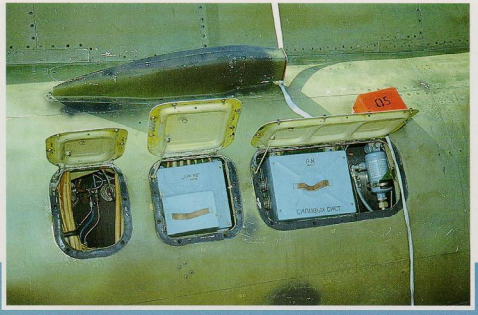


The hydraulically actuated airbrakes cover a 50° arc. The lower port airbrake housing accomodates the GA-184U valve of the RA-30A servo unit of the autopilot.
A similar valve for the airbrakes can be found in the starboard housing.



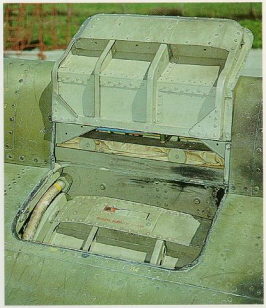
The hydraulically actuated three section slat runs the full length of the wing's leading edge, extending forward 126mm and down 10° in high lift position. Both the inner Fowler flaps and the outer split flaps deflect 25° hydraulically. Inner flaps and slats operate together throughout the wing setting range from 30° to 60°, outer flaps are used only for landing with the wings at a 30° sweep.
Ailerons on all aircraft where replaced with reinforced, riveted ones because of fatigue problems.

(Right) On parked aircraft the generator cooling intake is plugged while the P69-2M temperature probe is covered. The forward engine bay houses the air separator of the main hydraulic system. The gray boxes are heavy current relay units. The engine mounting is accessible through the rear hatch.



(Below) The dielectric panel on top of the fin covers the R-862 communications radio aerial. The BU-220DRP booster operates the rudder to a 25° deflection on both sides. The SPO-10 RWR aerial is located at the bottom rudder hinge. BU-250L and BU-250P boosters operate the left and right tailplanes through sway braces, deflecting according to speed and altitude. Maximum deflection is 10,5° up and 26,5° down on the ground. The slightly bulged shape of the tail section is a result of the larger R-29 engine installed.

Inside detail of the large fin fairing acting as drag chute housing. A heat resistant steel plate protects the split cone from the exhaust gases.

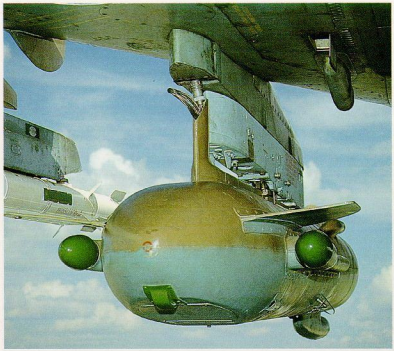


Unique feature on the Su-22 is the access hatch to check 1st and 2nd compressor blade's condition prior to the first run up of the day. The inner panel (between fuel pipes) can be removed to gain access.

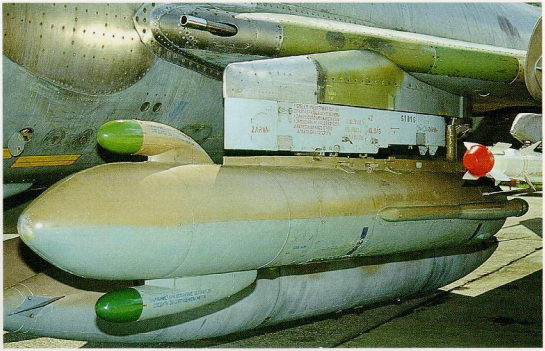
The dielectric cone of the smaller fin fairing covers an RSBN-6S and two SO-69 aerials. The SRO-2 aerials are mounted on the "wingtips".

(Left) A device stowed in the tail root fairing counts engine operation time and the number of engine starts. Both larger (generator cooling air) and small (fuel system pressurization) intakes are plugged and connected by a "remove before flight" ribbon with those on starboard side.
The forward fuselage bay houses the air separator of the second hydraulic system. The gray boxes serve the same systems as on starboard side, so does the aft inspection panel.

(Below) The oval panel between the wing fence and the fuselage covers the wing sweep actuating jack. Also note the various inspection panels in bottom of the tail and the small fuel drain pipe underneath the tail cone.



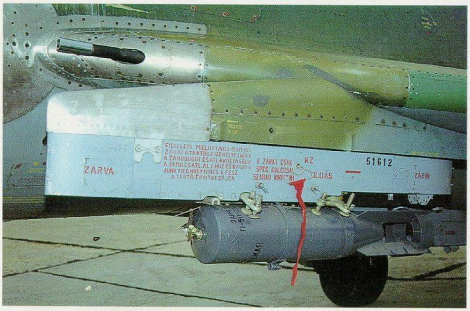
For active ECM protection in a high threat environment the Su-22M3 can be equipped with a V-141 MVGKE (SPS) pod on standard BD3-57MT pylon attached to the inner (N°5) or outer (N°3) wing stations on port side. A UB-32A rocket pod is carried symmetrically for aerodynamic balance.



The ECM pod features emitter antennas (right rear and bottom front) and receiver antennas (left rear and top front). The rear rectangular antenna facing down is also an emitter. Barely visible are a temperature probe and cooling air intake on the right side of the pod. Also note the inward position of the port cannon in this view, in comparison with starboard side.

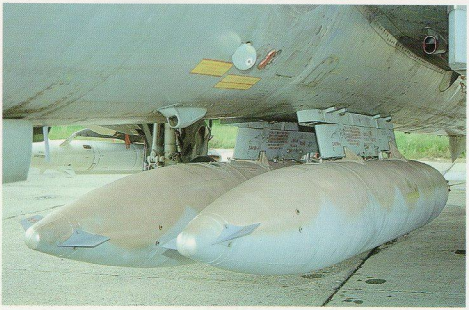
The KMGU-2 cluster bomb consists of eight compartments with six subcompartments, each containing either two 2,5kg bomblets, two 1,7kg anti-armor mines, four 0,67kg fragmentation mines or twenty-six 0,08kg leaf-shaped anti personnel minelets. The dispenser can also be used to drop propaganda leaflets.

The Su-22 can carry up to six S-24 unguided air to surface missiles on APU-68UM3 launchers, attached to the BD3-57MT pylons on the inner and outerwing stations, or underneath the forward fuselage stations (see also page 23).

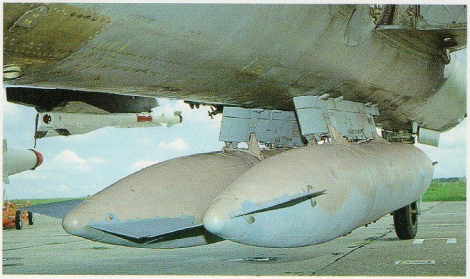


The aircraft is capable of carrying any kind of bombs, ranging from smaller practice bombs, like this P-50-75, over100kg to 500kg heavy loads. Delivery can be made by level, dive or toss bombing.

(Right) The KKR-1TE/2MK reconnaissance pod consists of two sections. The forward accomodates a battery of three cameras (A-39 forward/oblique, PA-1 panoramic, UA-47 night) and a dispenser with 152 target illumination flares. The aft section serves an Elint suite with dielectric fairings on both sides for electronic signal detection of hostile radars.



Up to four 850l droptanks can be fitted to fuselage stations N°1S and 2S and to the outer wing stations. These are either camouflaged or bare metal and have their own filling points forward and aft of the pylon. Note winglets on both ends.



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3rd "Fürkészdarázs"
Tactical Reconnaissance Squadron
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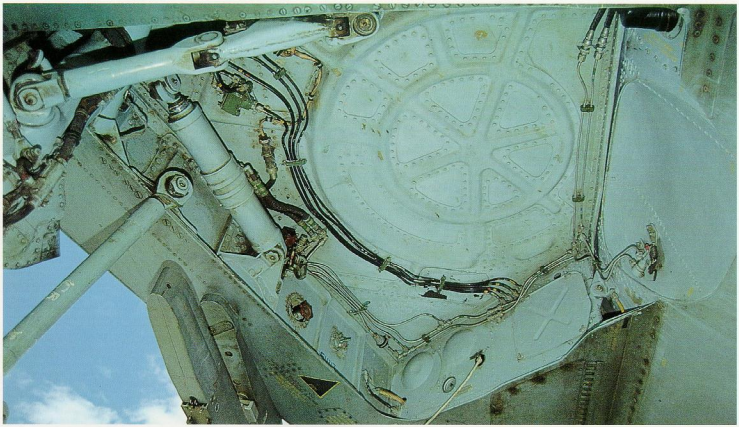
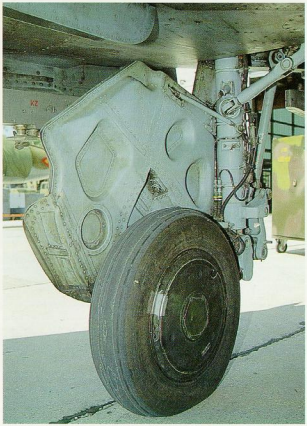
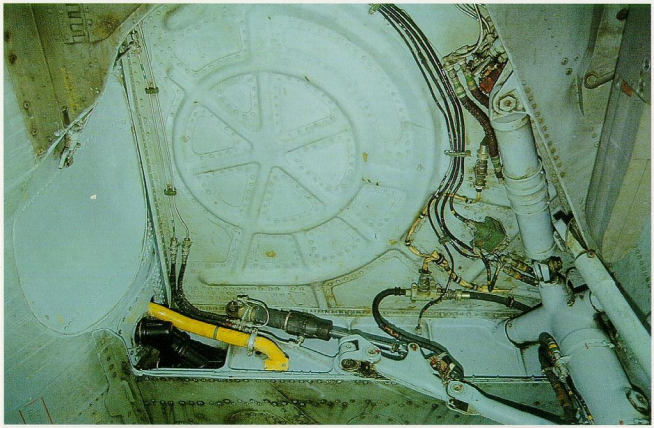
(Photo by Zoltán BUZA)



The only differences between left and right wheel well are found on outer and forward walls in the form of the filling valve, filler point and pressure gauge of the inert gas system. Nitrogen is used for fuel tank pressurazation on operational sorties.

The port cannon bay is much larger with the gun mounted at front as seen in this photo which also shows the venting intake mounted on the access door.





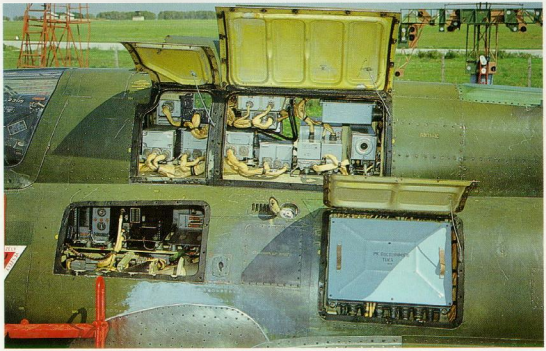
The sturdy undercarriage was constructed to withstand heavy landings either by inexperienced pilots or on unprepared landing strips. Their strength was proven once when a pilot, turning for "final approach" over the fence at tree top level, selected afterburner to prevent loss of speed. This acceleration made him overshoot the treshold at 400km/h instead of the indicated 280 km/h in a "down and dirty" configuration.
Additionally, he deployed the brake chute (not permitted above 320km/h) and pulled back the stick to reduce descent.
This resulted in a steep 8m climb which made the aircraft stall, followed by a severe loss of speed which made it hit the runway from a 5m altitude, bouncing several times on impact. Finally, the aircraft stopped having travelled a few hundred meters down the runway, only damaging its ventral fin.

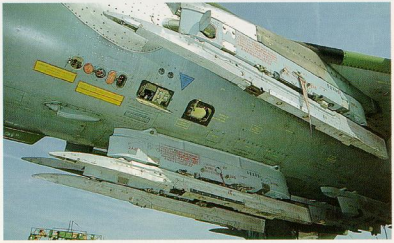
(Right) The port side of the nose section features a DUA-3 angle of attack sensor, forward of the suction relief doors. More points of interest are a PVD-7 auxiliary pitot tube, a P69-2M temperature probe, a small blade aerial (of the SO-69 transponder) and a smaller one for the LO-86E guidance system of the H-25MP anti radiation missile.
The holes above and below the tactical number are mounting ladder hookups.
Note the effect of the contrails in the airspace behind.

(Below) The DISS-7 Doppler radar is located ahead of the nose wheel well behind a green dielectric panel. The forward dish emits four beams at known frequencies to the ground. As they are reflected back to the rear dish, the frequency of the forward beam increases while those of the rear are reduced in proportion to the speed in any direction. The onboard V-144 computer analyses the frequency shifts and determines the speed of the aircraft and the angle of drift. Finally, it provides the necessary data for the aiming, IKV, SVS and RSBN systems.
The RV-15 (A-031) radio altimeter aerials are forward and aft of the Doppler radar.
The retractable PRF-4M lights on the side have assymetric fairings. The pilot can select either power, 180W for taxiing or 600W for take-off and landing.

Wing leading edge antennas are an ARK-15M aerial covered by a dielectric panel inward of the wing fence and a complex array outward of it consisting of a SO-69 aerial, two protruding SRO-2 "buttons" and an SPO-10 aerial between them.

The avionics bays on port side accomodate the SAU-22M1 autopilot, fuel flow transmitting amplifier and the ARK-15M radio compass receiver. The forward fuselage bay houses the V-144 computer mentioned earlier, the rest of the space is for the RSBN system. The small hatch serves as a water/alcohol filler point for the cockpit air conditioning system. Aft of it is the circuit breaker box for the direct current system.

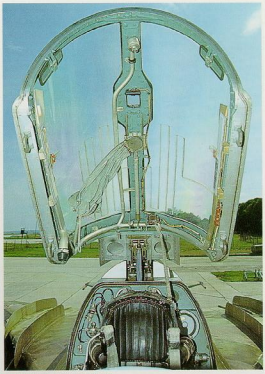




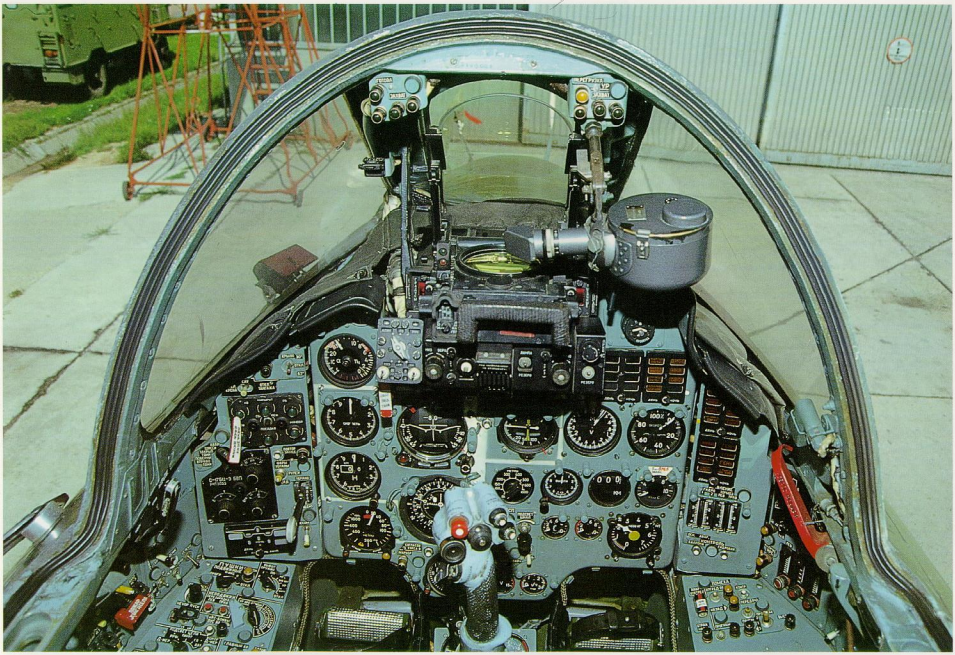
Underfuselage details comprise avionics compartment cooling intake, weapon arming switch, intercom connection, external power receptacles (115V 400Hz AC and 27V DC), oxygen system filling point, O2 pressure gauges and the SAU diagnostic connector.

(Above) The center section of the windscreen is made of 40mm thick armored glass, electrically heated for defogging. Additional protection is given by a 22mm armorplate attached to bulkhead N°4, forming the forward cockpit wall. The avionics bay ahead of the windshield houses gunsight related electronics among others. The canopy latch, temperature probe and angle of attack sensor are located on the port side.

The perspex hood opens to a 50° angle by pressurized air. Taxiing with open hood is common practice and is allowed at speeds up to 80km/h. Inside details are the rear view mirrors, electrically heated periscope, air blast piping, pneumatically operated curtain for instrument flying and the canopy/ejection seat sequence chord.

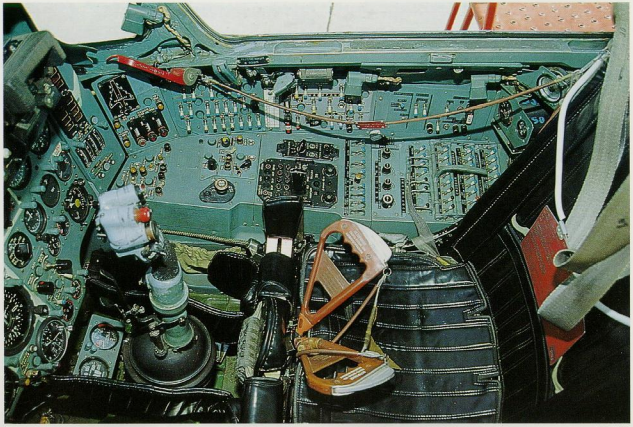


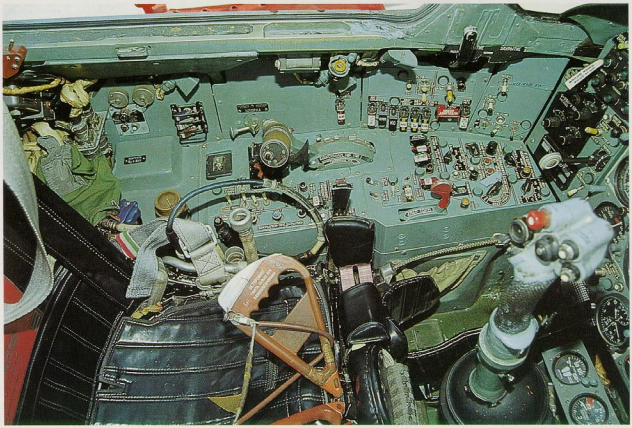
(Right) Visible details of the aft spine are the rectangular dielectric fairing of the ARK-15M aerial, the twin KDS-23 dispenser on starboard side and the central refueling point with control panel. Internal fuel capacity is 4900l in five fuselage and two wing tanks. With the additional 850l underfuselage tanks and two 1150l underwing drop tanks, total fuel capacity exceeds 8900l.



Compared to earlier soviet cockpit designs, which were ergonomic nightmares, the Su-22 pilot's station is roomy and designed to facilitate the pilot's job. Visibility was largely improved, as one pilot described his first impression as "sitting on top of a barrel high above the ground". Another stated that the only shortcoming was the absence of a stewardess. Anyway, main instrument panel layout is much clearer compared to earlier types with flight and navigation instruments left of the white centerline. The wing sweep angle indicator is partially visible left of the gunsight, while its selector switch is further to the left. Below it is the SAU control panel, the white undercarriage/flap emergency release handle, an armament control panel, the landing gear/flap/airbrake position display, the landing gear control handle and the nose wheel steering engage switch. Right of the white centerline are engine monitoring gauges and some more flight instruments as well as the nose cone and spill door position indicator. Fuel control instruments and hydraulic pressure indicators can also be found here next to the master caution panel. The combiner glass of the ASP-17BCE optical gunsight has different settings depending on weapon delivery mode but, unfortunately, it does not work automatically in connection with the weapon selector panel. An array of indicator lights on the windshield frame informs the pilot of a missile lock (all modes).

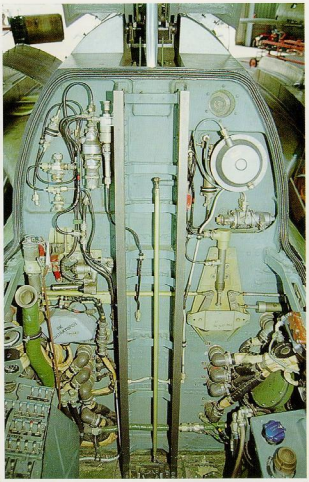
The right sidewall features an armament display panel, two indicators for the NR-30 cannons and a center indicator for the SPPU gun pods when installed. Below the red canopy emergency jettison handle are the main switches for the following systems: Tester U-3, SPO-10, ejection seat pyrotechnic cartridges, DISS-7, RV-15, UUAP-72-M-7 angle of attack and accelerometer, ARK-15M, RSBN-6S, MRP-56P, V-141 VMGKE (SPS), aiming system, SAU-22M1, SO-69 and SRO-2. Further aft are a control panel for the IKV-1 and RSBN-6S system.
The side console holds the control panels of the SPS ECM pod, the KDS-23 dispenser and the SO-69, SRO-2, RSBN-6S, ARK-15M systems. Aft of these are various switches for the electrical system, the cockpit light control panel and rows of circuit breaker switches. The cockpit pressurization/air blast system control switch is also on the right, allowing the pilot to switch for oxygen in case of bird ingestion (as the air is extracted from the fifth compressor stage).



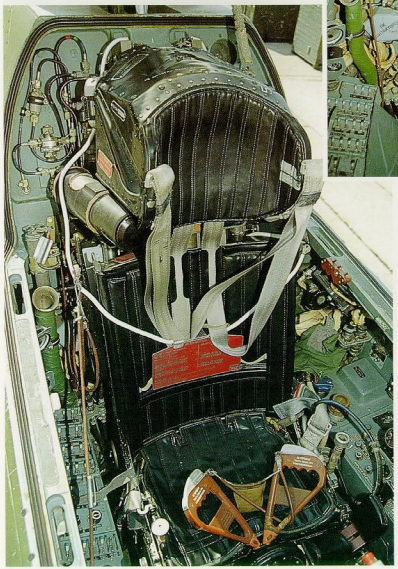


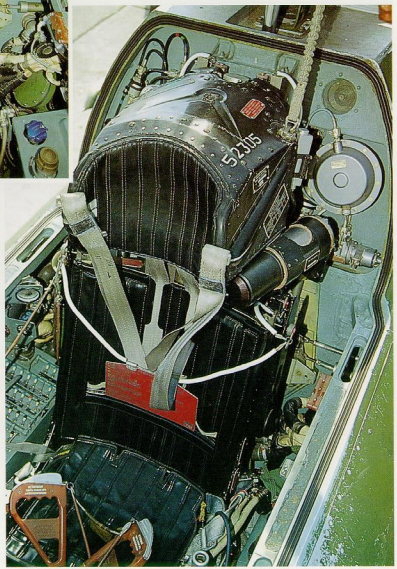
The canopy control handle is installed next to the windscreen with the drag chute control handle also on the lower cockpit framing. If an aircraft is wired for carrying the KKR recce pod, its control panel is installed on the sidewall, next to the instrument panel. To the rear of it are the ARK-15M, fire extinguisher (red), NS-3 emergency hydraulic pump, nose cone and spill door manual control and engine emergency control switches.
Above the throttle quadrant can be seen the starter switch which is used when an inflight engine restart fails. The oxygen system and ejection seat control panels are on the aft section of the sidewall.
To the rear of the weapon control panel (on the side console) is the red emergency brake handle. The drag chute jettison switch, KDS-23 control panel, R-862 channel selector, flap control panel, SRO-2 emergency control panel, PPK anti G-suit control valve and the blue oxygen shut off valve are also located on the side console.

The bottom photos clearly show the canopy sill with locking slots and surrounding inflatable rubber seal. On the port side, to the rear wall can be seen the redbrown connector of the transparency-mounted ARK-15M aerial. On the other side of the seat and also mounted to the rear wall are the TS-21 starter gas turbine temperature gauge, air pressure and engine oil pressure gauges. Note the ejection seat and canopy jettison safety pins.

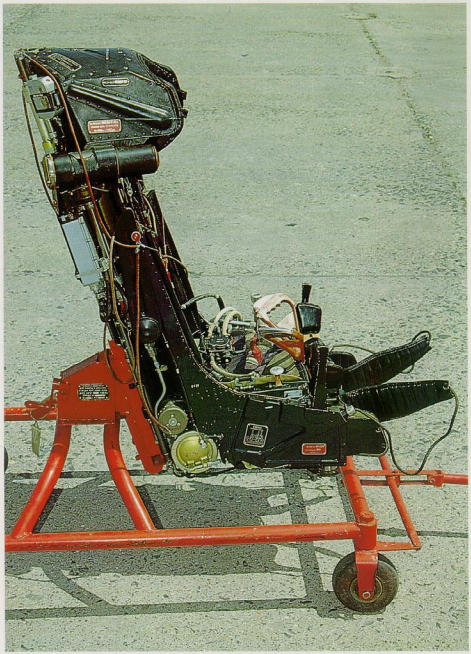


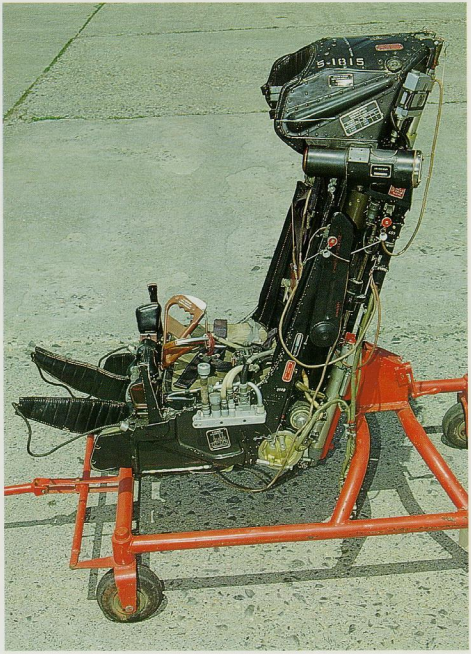
(Left) The ejection seat guidance rail is secured to the rear cabin wall as is standard with all jet aircraft. The pipe of the canopy blast system, the canopy pyrotechnic jettison cartridge and various units of the pneumatic system related to the canopy curtain and the inflatable seal are on starboard side.
The units of the cockpit pressurization system and the emergency canopy unlock sway braces are on port side. Note the ejection seat lock at the bottom of the rails and the color of bulkhead and floor.

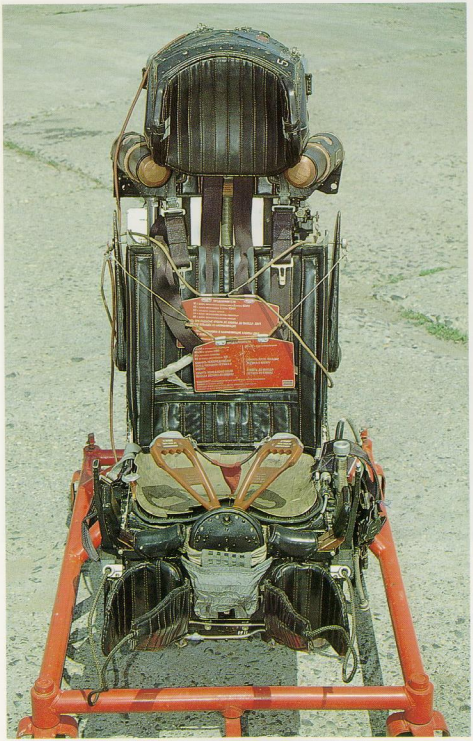


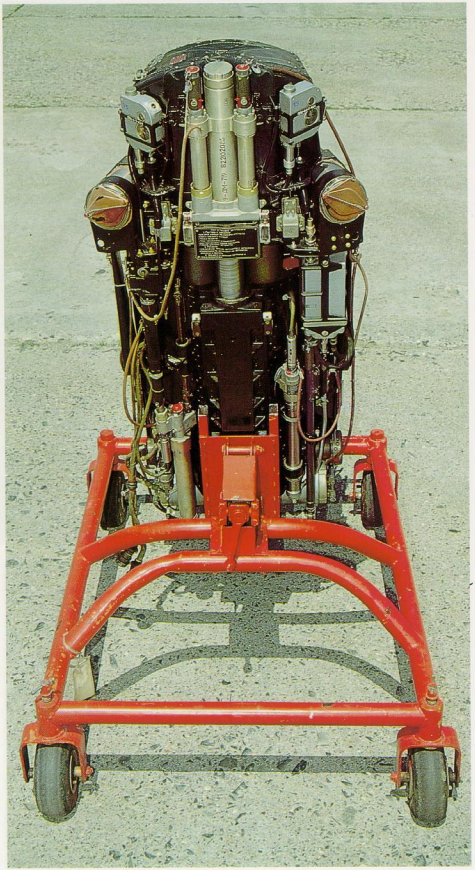


The K-36DM is usually referred to as a zero-zero ejection seat (and it has proven so on many occasions), however the pilot's manual illustrates that performance is influenced by many factors. Officially it can be used on the ground at a speed of 75km/h and at any altitude if the speed is below 950 km/h. To eject safely at 1200 km/h a minimum altitude of 40 m is needed as a safe margin (at least 70 m at 1400 km/h). In reversed flight a minimum altitude of 200m is required, dropping to 150m if in a 90° banking position. In dive, the minimum altitude can be calculated multiplying the vertical component of speed by four (if given the time !).
Ejection itself is quite smooth and the pilot remains conscious during the ejection sequence. In the case of Lt.Col. Vámos (see page 5), no real physical injuries were sustained although minor compression of a vertebra was discovered. Unique features are the pyrotechnically operated telescopic rods with stabilizing chutes located on both sides of the headrest containing the PSU-35 (2nd series) recovery parachute. The NAZ-7M survival kit, containing three days provision among many other useful things, is as usually packed in the seat pan.
The PPK-1M-T-424 delay semi-automaton, canopy jettison control rod, pyrotechnic cartridge of the S-36 stabilizing system, lap belt restraint unit and red emergency oxygen knob are on the right side of the seat.

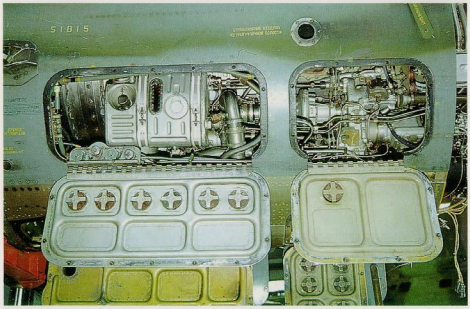






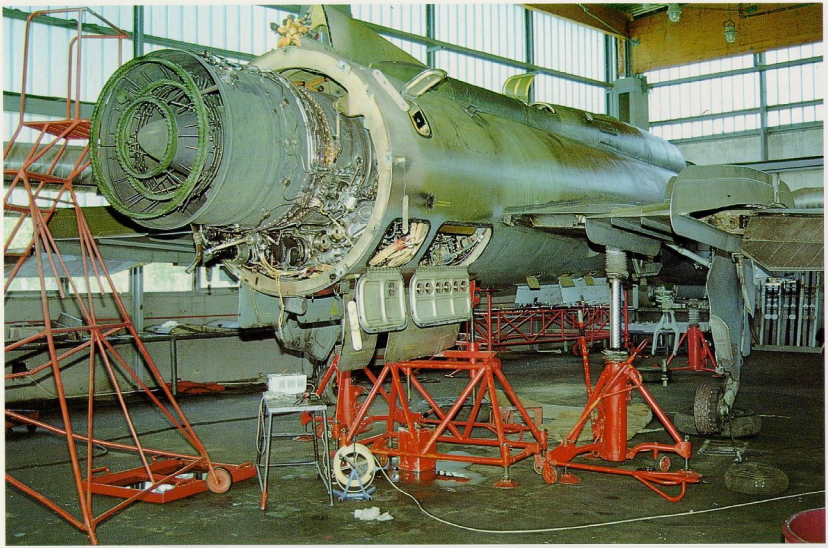


The pilot is protected by foldable support arms, leg restraint chords, telescopic knee lifting devices and, at the root of the ejection handles, a deflector which operates from 850 km/h onwards or at any speed in case of electrical system malfunction. The IPS-72 harness has five connections, one for the NAŽ kit and two each for the seat and parachute. Presence of the red instruction panels indicates all safety pins are installed. The plastic cushion protector is removed moments before the pilot boards the cockpit.

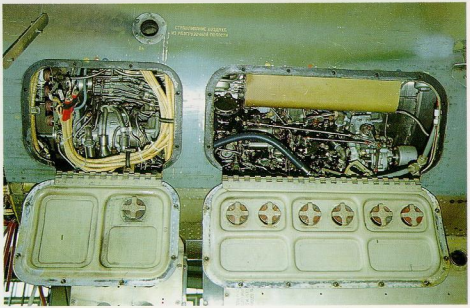


Maintaining the Su-22M3 is easier than safekeeping earlier Soviet types such as the MiG-21, despite the presence of more complex systems. Because these systems are practically grouped and easy accessible, and the use of modular units and automated diagnostic sets. Maintenance philosophy remained unchanged, with 100, 200 and 400 hours scheduled airframe inspections instead of "on condition" overhauls. Additionally, periodical check-ups are performed every 60 and 120 days.
This stripped Su-22 shamelessly presents its intimate detail. The tail section is removed by unscrewing 6 bolts connecting bulkheads 34 and 34a, gaining access to the engine and its auxiliary units.
Visible are the RTF-55A afterburner fuel distributor, fuel pipes, radial and axial flameholders and the TS-21 starter gas turbine.
Note the pivoted outer wing has an auxiliary roller which can be seen in the hollow wing glove section.

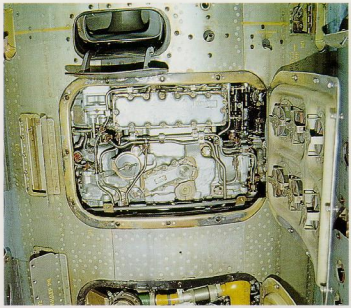
(Left) Close up of the port engine bay features the 13,5l capacity oil reservoir, ground power hook up, hydraulic reservoir filler valves (1st and 2nd hydraulic systems), DCN-64A fuel pump and the VS-1 metal chip detector of the oil system.



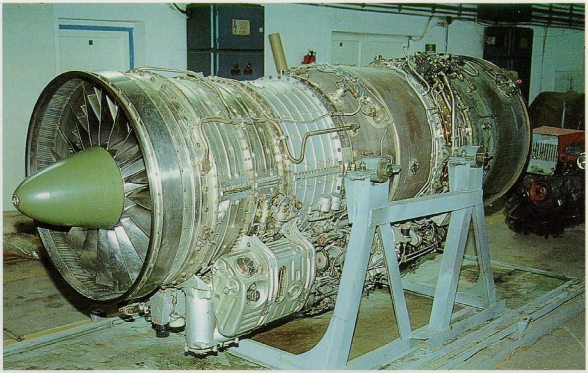
The Su-22 has two separate hydraulic systems located in different places (to reduce vulnerability). One system is on port fuselage side and operates flight control boosters and wing sweep control systems. The second system is on starboard side and operates the undercarriage, nose gear swivel system, automatic braking of the main wheels during retraction, air brakes, flaps, slats, rudder, nose cone travel, spill doors, autopilot servo units and flight control/wing sweep control systems.
Primary sources of the 27-28,5V DC system are two GS-12VT generators while an SGO-8 alternator takes care of the 115V 300-900Hz AC system. Their drives can be seen on the engine gearbox which is mounted on the bottom quadrant.



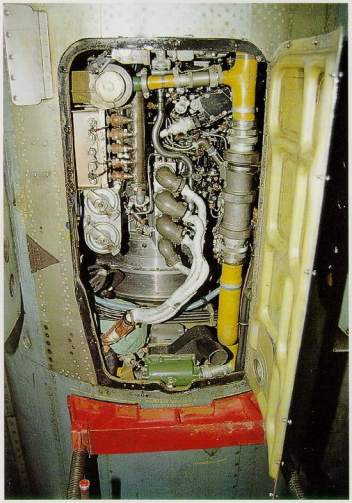
The starboard engine bay accomodates the engine control unit, control rods, microswitches and (not in place here) the GS-12VT generators and an NP-34-1T hydraulic pump.
Note the engine compartment cooling disc valves in the doors and the engine hot air exhaust above the bay. These engine bay access panels are usually open during flightline operations as mechanics check for fluid leaks.

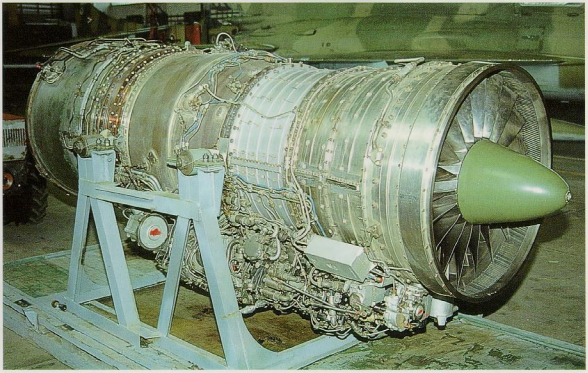


The TS-21 gas turbine starter exhaust is located aft of the rear engine bay containing oil pump and oil filters. Forward bay mainly holds fuel flow control systems.



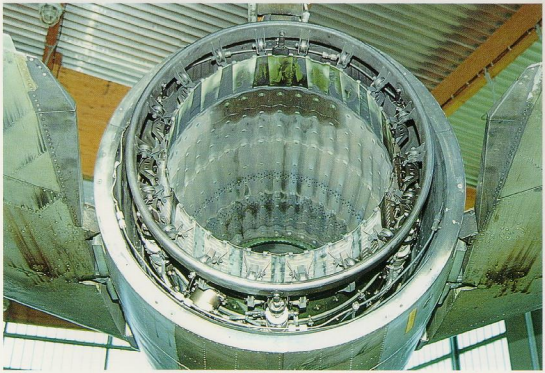
The Tumansky R-29-300 (Type 55BS) engine is a two-spool, axial flow, afterburning turbojet with five high and six low pressure compressor stages. It has a circular combustion chamber and single high and low pressure turbine stages.
Maximum dry thrust is 78,4kN while maximum thrust with full afterburner is 112,8kN.
Most of the auxiliary systems are located below the engine clearly shown in these views. Note the engine mounting brackets.





(Right) The open hatch seen here gives access to the gas turbine. Also visible are an engine hot air exhaust and an SRO-2 aerial next to where the ventral fin should be installed.

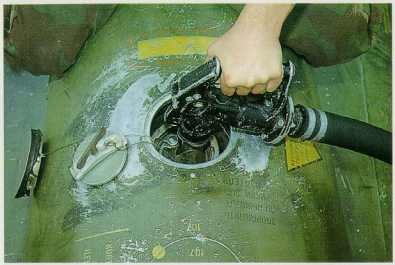
(Below) The variable exhaust nozzle is operated by the RSF-55B system through three controlled and three synchronized actuators, using fuel instead of hydraulic fluids. Note the fire detecting sensors surrounding the nozzle.



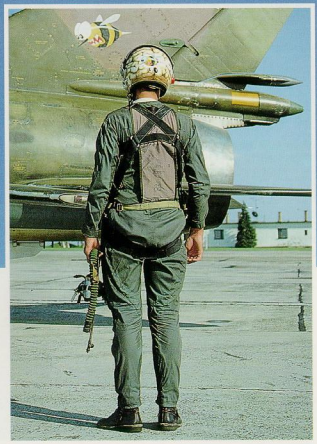
MS Atilla Nemes installing a temporary handle before removing the various units of the KLEN-PS laser rangefinder and target designator mounted inside the nose. Contrary to today's homing systems (which utilize rotating heads to keep the laser beam fixed on the target i.e. the F-111) the KLEN system does not allow the pilot to make evasive maneuvers without affecting the accuracy of aiming. The pilot has to visually acquire the target, fix the gunsight crosshairs on it and keep it there until impact.

Man and beast, in this case a mechanic who seems to be quite attached to the massive looking Sukhoi fighter which, from some angles, can be considered a graceful aircraft. With a total overall length of 19,006m, height 4,90m and a wing span of 13,70m (at 30° sweep) - reduced to 10,04m at 63° back sweep and 3° dihedral- it outclasses many western fighters in size. Readied for an attack mission with 4900 l of internal fuel, 160 rounds of 30mm ammo, eight FAB-500 bombs, total weight exceeds 192,67kN. With this load it needs1400m of runway to get airborne, while in clean configuration 800m of concrete will do. Once airborne it can attain Mach 2.1. Further acceleration is limited not by thrust but by wing flutter at higher speeds. Service ceiling is set for 15000m.

Initially designed as an attack fighter it is optimized for medium and low level operations, although it outrolls many MiG-21 class fighters in close aerial combat because of a better thrust-to-weight ratio.

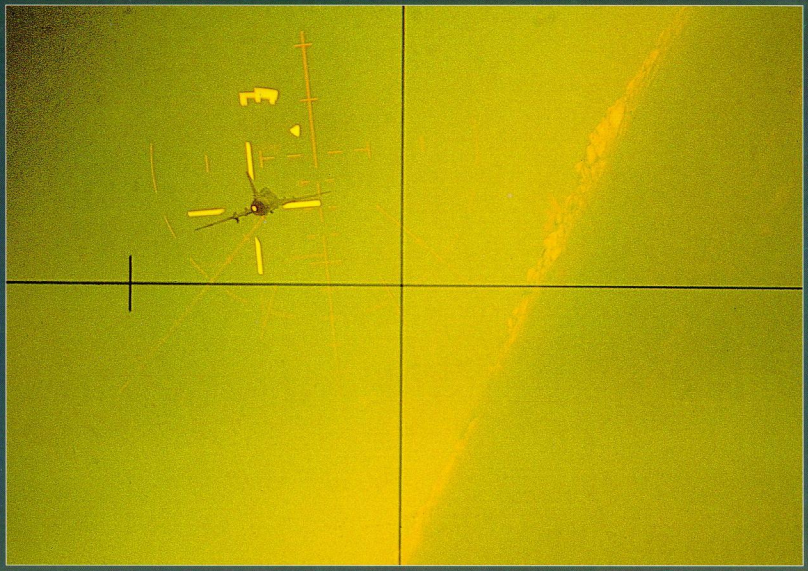


Big "03" being readied for a nightime "peeping" sortie in May, 1993. While the fuel tanks are topped with thousands of liters of kerozine, the flight data recorded by the Tester Ú-3 system is fed into an ABZOR MN-P portable tape recorder. The casette is the input source of the data analysing system (originally a 6 kbite ASVT M-6000 computer). Flight data was represented graphically on paper tape, an unreliable system later replaced by a Hungarian designed evaluation system. Úsing the same input source, the data recorded on 34 analog and 32 two-state channels is evaluated by the TISZA system, based on an IBM-PC compatible computer. Úsing the express evaluation mode it provides information about the aircraft's condition in seconds, substantially reducing service time between sorties.
Installing the 25m2 PTK-75Ú brake chute is still performed manually with the aid of a simple stepladder, followed by a hop on the port stabilator to connect the chute with the electrical lock inside the fairing. Note the white navigation light on the vertical tail.



Because of its limited ground clearance, Lt. Tamás Szvath offered to show the belly and bottom side of the KKR pod in the air. Note the chevrons applied over the initial national insignia and the natural metal appearance of the tail section.

Some Sukhoi drivers prefer the gray ventilated flight suits illustrated here at right. Also visible is the back side of the IPS-72 harness.
The "Fürkészdarázs" (Ichneumon Fly) marking is the brainchild of Lt. Szvath who proudly poses his "brainbucket". Although the ichneumon fly is a harmless insect by human standards (being a parasite of larves of butterflies and moths), in Hungarian the word fürkészdarázs sounds more agressive. "Fürkész" means searching while "darázs" stands for wasp, illustrating both the recce and attack roles of the aircraft.



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